

## Schwarz-1, Henry

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**From:** Palmer, Michael J [michael.j.palmer@usago.ksc.nasa.gov]  
**Sent:** Monday, January 13, 2003 10:12 AM  
**To:** Frazer, John W.; Beil, Robert J ; Douglas, Tamara A ; Sterritt, John M; Wells, Thomas F;  
Coyne, James M  
**Subject:** STS 107 L-1 System S0007.ppt

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

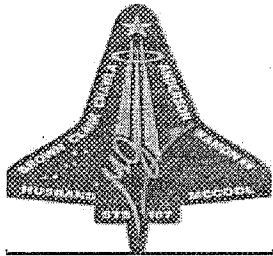
Jim Coyne needs a breifing chart for the L-1 on the BSTRA Ball crack. He needs it by 1 o'clock, so I need inputs back yesterday.



STS 107 L-1 System  
S0007.ppt

ITEM

5



## USAGO Shuttle Engineering

Kennedy Space Center, Florida

### STS-107 / OV-102 L-1 Day Crew Briefing (S0017)

System / Presenter

**SYS: Michael Palmer**  
**NASA: Tamara Alexander**

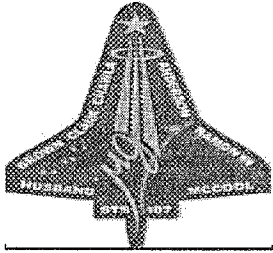
#### MISCELLANEOUS

##### Problem:

- A crack has been found in the ball of the LO<sub>2</sub> 17 inch feedline manifold end ball-strut-tie-rod assembly (BSTRA) on OV103 during routine OMDP inspections.

##### Impact:

- This same inspection was performed on OV102 prior to last flight while the vehicle was at Palmdale for OMDP. No anomalies were noted. As a result of the cracked ball, all BSTRA joints on OV103, OV104 and OV105 have been inspected (18 total per vehicle, 3 each on the LO<sub>2</sub> and LH<sub>2</sub> 17 inch feedlines and 2 each on the LO<sub>2</sub> and LH<sub>2</sub> 12 inch SSME feedlines). No other cracks in the fleet have been observed. Design has performed testing to better understand the properties of the materials involved. Testing included subjecting BSTRA balls to cryogenic conditions and applying a load, resulting in shallow cracks developing in several test subjects. Once the cracks formed, they did not increase in length as a result of cryo/load cycles. The major concern was particulate generated as a result of crack formation. Analysis was performed by Rocketdyne and it was determined that particulate of the size generated during testing could readily be ingested by the SSME and would not be a concern. Tooling has been developed to manipulate the BSTRA balls on the orbiter and the cracked ball on OV103 has been completely inspected visually (see attached photos). The crack in the OV103 BSTRA ball is similar to the cracks in the test subjects. Based on this analysis, OV102, OV104 and OV105 have been approved for one flight.



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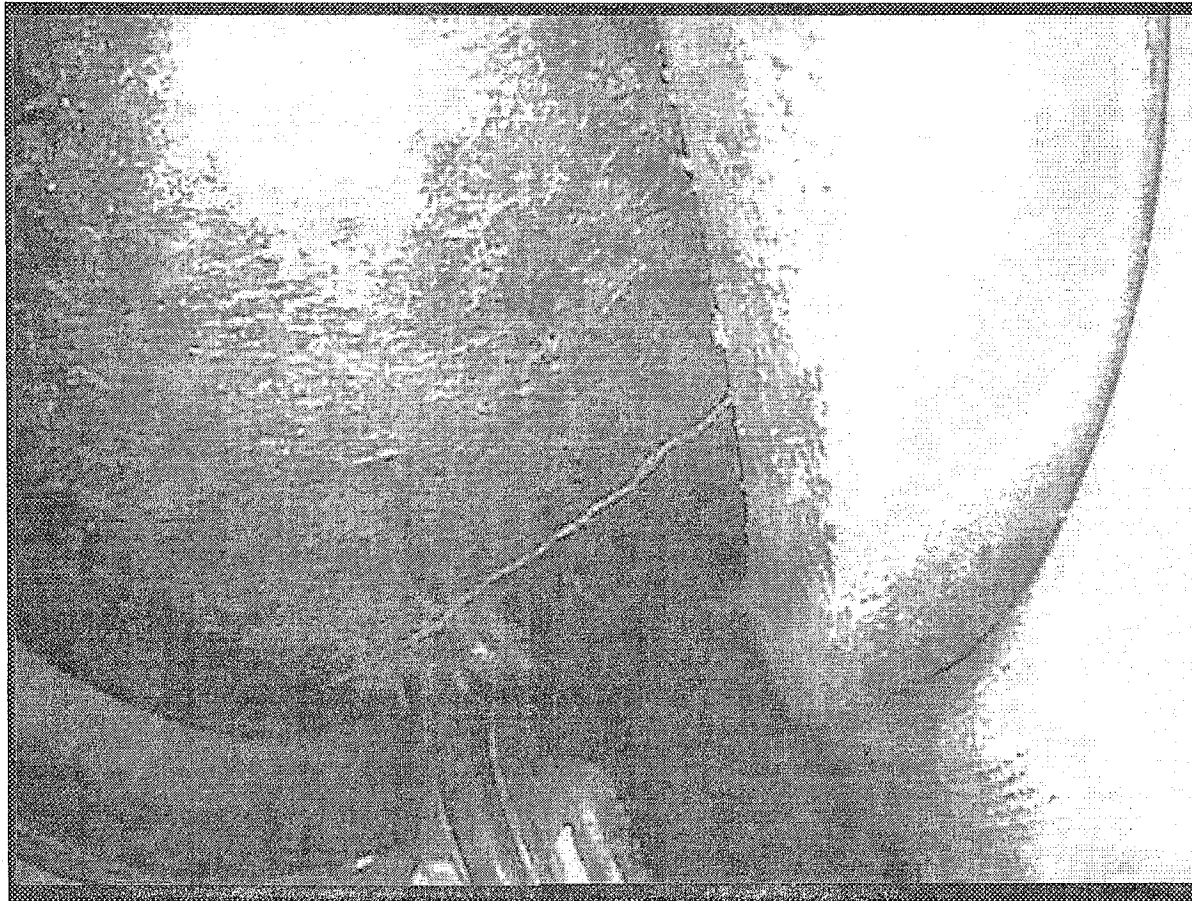
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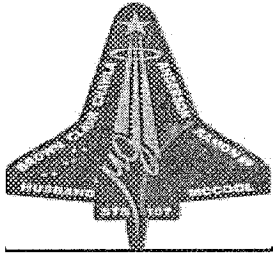
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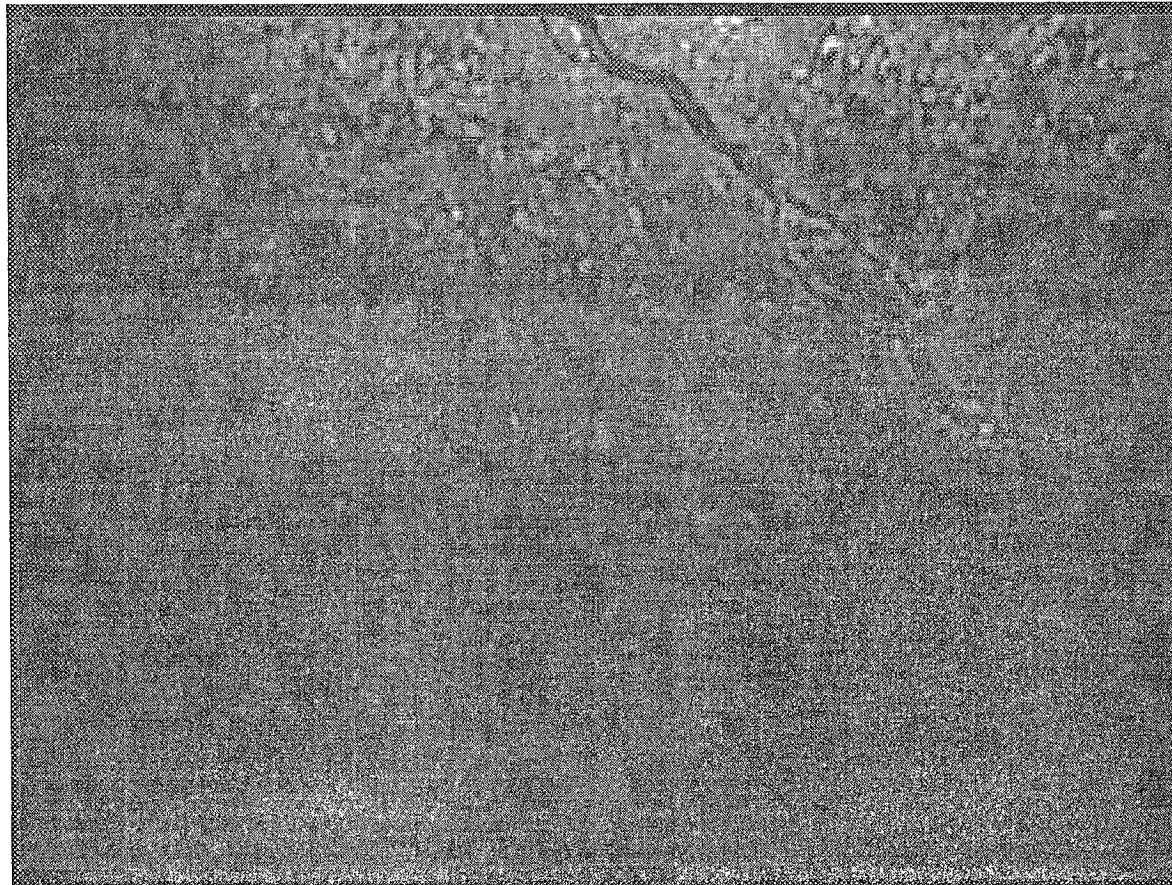
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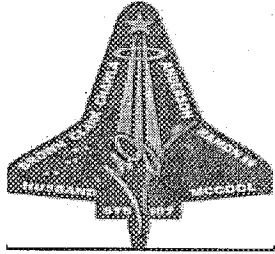
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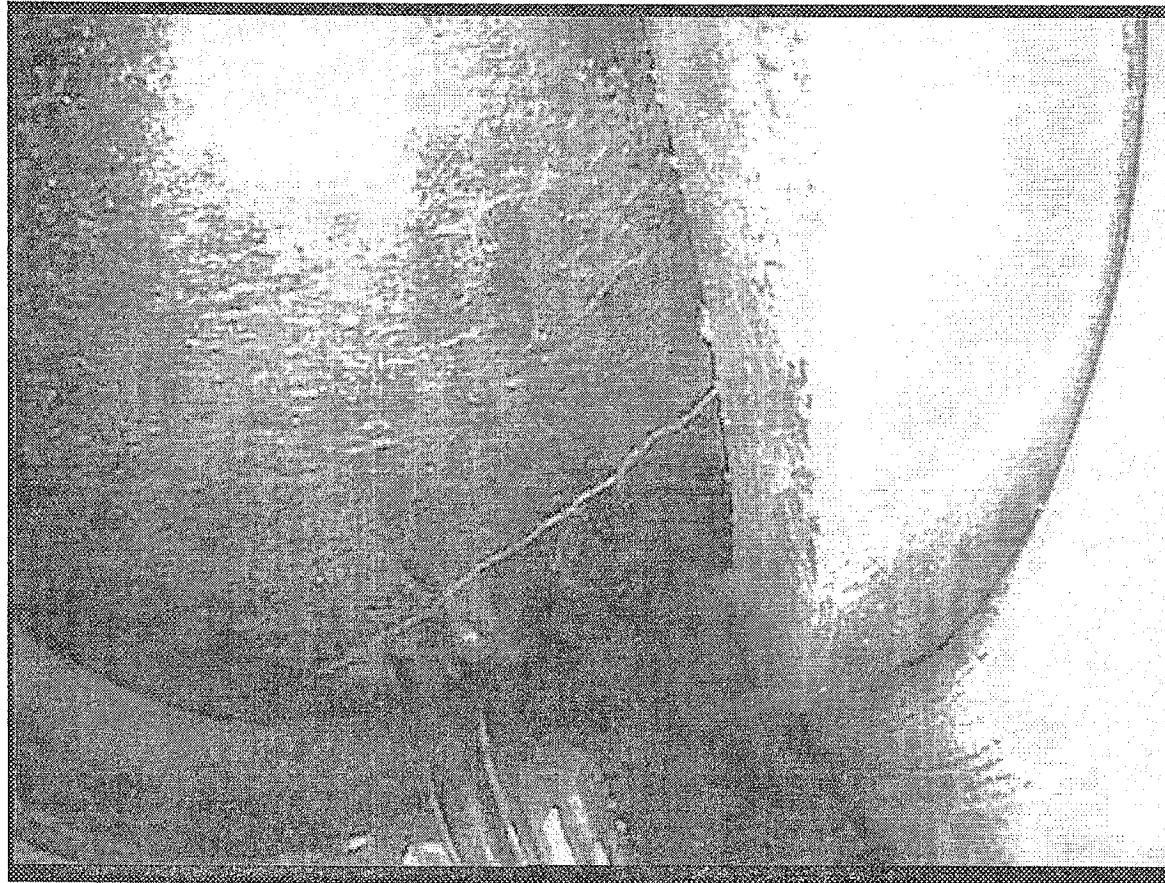
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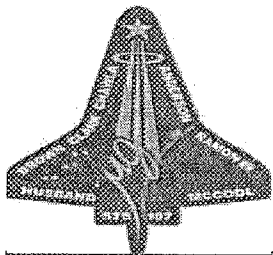
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